DOCUMENT RESUME

ED 457 155 SP 040 259

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TITLE The Consistency of Systematic Classroom Observations in Urban Schools.
SPONS AGENCY Ewing Marion Kauffman Foundation, Kansas City, MO.
PUB DATE 2001-09-24
NOTE 35p.
PUB TYPE Reports - Research (143)
EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Classroom Observation Techniques; Elementary Secondary Education; Research Methodology; *Teacher Behavior; Teacher Evaluation; Teacher Student Relationship; *Urban Schools

ABSTRACT

This study investigated the consistency of classroom process variables. Four teachers representing the primary, intermediate, middle, and high school levels of instruction were observed for extended periods of time. Information about four classroom process variables was collected using the Five-Minute Observation component of the SRI Classroom Observation System. The process variables were: initiator of the classroom interactions, recipient of the interactions, intent of the interactions, and type and effect of the interactions. Spearman Rank Order correlations indicated high levels of consistency for the process variables for the four teachers over repeated classroom observations. Content analysis of the teachers' pattern of interactions showed that for three of the four teachers, classroom process variables remained consistent when the primary and intermediate level teachers taught different content to the same group of students and when the high school teacher taught the same content to different groups of students. Limitations of the study and findings are discussed in relation to previous and future research. (Contains 7 tables and 24 references.) (Author/SM)

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The Consistency of Systematic Classroom Observations in Urban Schools

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This research was funded in part by a grant from the Ewing Marion Kauffman Foundation.

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Abstract

The present study investigated the consistency of classroom process variables. Four teachers representing the primary, intermediate, middle and high school levels of instruction were observed for extended periods of the time. Information about four classroom process variables was collected using the Five-Minute Observation component of the SRI Classroom Observation System. The process variables were initiator of the classroom interactions, recipient of the interactions, intent of the interactions, and type and affect of the interactions. Spearman Rank Order correlations indicated high levels of consistency for the process variables for the four teachers over repeated classroom observations. Content analysis of the teachers' pattern of interactions showed that for three of the four teachers, classroom process variables remained consistent when the primary and intermediate level teachers taught different content to the same group of students and when the high school teacher taught the same content to different groups of students. The limitations of the study and findings are discussed in relation to previous and future research.

The Consistency of Systematic Classroom Observations in Urban Schools

Recent interest in improving classroom performance of American students, particularly those enrolled in urban school districts, and "school effectiveness" research (Levine, 1991; Levine & Lezotte, 1990) has brought renewed interest in classroom observation as a method for understanding and evaluating instructional practices and for documenting outcomes of reform efforts (Diebold, Miller, Gensheimer, Mondschein & Ohmart, 2000). Evaluations of the effectiveness of reform efforts have focused on both product and process outcomes. In addition to student achievement measures, measures of teacher attitudes and expectations, and, most recently, observations of teachers' instructional practices have all been used to describe the learning environments in schools (Waxman, Huang, Anderson, & Weinstein, 1997; Turner & Meyer, 2000).

Classroom observations provide information about the frequency and/or duration of teacher and student behaviors and interactions in naturalistic settings (Anderson & Burns, 1989). Observational data can be used to triangulate reports of classroom practices from teachers and students (Waxman et al., 1997; Turner & Meyer, 2000). Feedback from systematic classroom observations can be the vehicle for schools and teachers to reflect on the strengths and weaknesses of the instructional practices they are using in their classrooms (Nuthall & Alton-Lee, 1990).

Recent reviews of factors that affect student learning have concluded that individual, proximal student and classroom process

variables have a much stronger impact on student learning than school or district-level variables do (Baker, 1999; Wang, Haertel, & Walberg, 1990, 1993, Waxman et al., 1997). Increasingly, systematic classroom observations have been used to identify the critical process variables that may be influential in student learning (Waxman, Huang, Anderson & Weinstein, 1997).

With the increased interest in classroom processes, classroom observation data has become an important tool in identifying classroom process variables that distinguish more and less effective schools and in testing conceptual models of effective schools. Conceptual models such as those developed by Scheerens and Creemers (1989) and Scheerens (1992) identify such classroom variables as time on task, structured teaching, opportunity to learn, high expectations for student learning, degree of monitoring of student progress, and reinforcement as components of school effectiveness. Tests of these models require careful attention to classroom process variables, and classroom observation is one vehicle for documenting the presence of these important classroom variables.

Empirical models such as one developed by Waxman, Huang, Anderson, and Weinstein (1997) also place strong reliance on classroom process variables. Waxman et al. (1997) used data envelopment analysis along with multiple regression analysis to select more and less effective and efficient schools from a large urban school district. Four schools were selected to represent the effective/efficient schools (E/E schools) and four schools were randomly selected as representatives of ineffective/ inefficient schools (I/I schools).

Fifteen classrooms were randomly selected from each school, and classroom observations in reading and mathematics, students' perceptions of the learning environment, and student motivations and aspirations were collected. Analysis of the classroom observation data found students in classrooms in E/E schools actively involved in the learning process. E/E classrooms were also characterized by high amounts of teacher student interaction

However, limitations in the use of classroom observations have been identified in the literature. Classroom observations have been criticized as focusing too narrowly on academic variables (Ornstein, 1991; Gage, 1972). The validity of classroom observations has been called into question due to reactive effects of the presence of the observer (Waxman, 1995). Other concerns such as the cost (time & money) of training observers and the misuse of classroom observation data have lead to more pragmatic concerns about the usefulness of classroom observation data (Waxman, 1995).

One of the primary concerns about classroom observations from the perspective of persons interested in improving teachers' instructional practices and student achievement involves the confidence one can place in the representativeness of a sample of classroom observations. Rogosa et al. (1984) posed the question "Is the behavior of an individual teacher consistent over time." (p. 1000). Rogosa and his colleaques argue that the above-mentioned question is rarely studied, but the importance of answering the question has far-reaching effects on the evaluation of current school reform efforts.

Lack of confidence in classroom observational data is a second important limitation of using classroom observations in educational process research (Baker, 1999; Waxman, 1995; Stallings & Freiberg, 1991). Until researchers can address the question of the consistency of teachers' classroom behaviors, stakeholders in educational reform and research will continue to have questions and concerns about the usefulness of classroom process variables in predicting or improving student achievement.

With the exception of two studies, the consistency of classroom interactions over time has rarely been addressed in the educational literature except as a limitation of studies that used it (Baker, 1999; Waxman, Wang, Lindvall & Anderson, 1988). In one study, Ayers (1983) collected supervisors' evaluations, student evaluations of teaching, and classroom observational data for a sample of 34 elementary teachers from a single teacher preparation program for a period of four years. Correlations across years and across the three different types of data indicated statistically significant coefficients across all but one of the 15 measures collected. Coefficients ranged from the mid .30s to the mid .50s. Ayers concluded that the data suggested that teachers' classroom behaviors and supervisors' and students' judgments of the behaviors are relatively stable over time.

Stallings and Freiberg (1991) reporting on a contract to evaluate National Head Start and Follow Through Planned Variation programs addressed the consistency of classroom processes using the Classroom Observation Instrument (COI). The COI includes measures on four

variables: classroom summary information, physical environment information, classroom activity checklist data, and teacher and student-focused classroom interactions. Observations were conducted in four first-grade and four third-grade classrooms in 36 school districts. Each classroom was observed for three consecutive days and teacher-focused classroom interaction patterns were collected on two consecutive days. Correlations between the classroom interaction variables for the two days yielded coefficients above .70 for 84% of the 140 correlational analyses. The authors concluded that "the consistency of instructional processes was surprisingly high." (p. 118)

The relationship between teacher instructional variables and student achievement has re-emerged as an area of research interest. With this interest has come a renewed interest in classroom observation procedures and the ability to explain variance in student achievement as a function of differences in classroom process variables. The use of classroom observation to collect information about classroom process variables has reintroduced questions about the consistency of teacher behavior as well as the influence of teacher behavior on student outcomes such as achievement, attendance and attachment to school. Demonstration that teachers' instructional or classroom behavior patterns are consistent over time, over content areas, and over different groups of students is critical to demonstrating a connection between teachers' instructional practices and students' achievement (Doyle, 1977).

Research suggests that different observers can obtain consistent pictures of classroom interactions and processes if observers are trained and if researchers introduce procedures to minimize observer drift. However, the inferences about teachers' classroom behaviors that can be drawn from classroom observational data remain of concern. Reactive effects of having an observer in the classroom have raised questions about whether observers are viewing typical/consistent classroom processes and typical/consistent teacher student interactions. Questions about typical/consistent teacher behaviors are further complicated, because the number and length of observations needed to describe teachers' typical/consistent classroom behavior patterns are not well documented.

The present study addressed the question of the consistency of teachers' classroom behaviors by studying the magnitude of the correlations between the frequency of teachers' classroom behaviors over repeated classroom observations. A primary, intermediate, middle level, and high school teacher were observed, and patterns of teacher-student interactions, instructional activities, and classroom affect were coded. These data were used to address two research questions. Do correlations among classroom process variables from different classroom observations exceed a coefficient of .70? Can stable patterns of interactions be identified for teachers? We adopted Stallings and Freiberg's (1991) correlation of .70 across observations as the criterion for consistency of classroom processes.

Method

Participants

Four teachers from a large, urban school district in the Midwest participated in the study. One teacher was randomly selected from each of the following grade levels; primary (K-3), intermediate (4-5), middle (6-8), and high school (9-12). Demographic data for the participants and their students can be found in Table 1. Table 2 shows the percent of observations by content area for each of the teachers observed.

Observation Instrument

The observations were completed using a modified version of the SRI Classroom Observation System (Stallings, 1977). The SRI Observation System includes three separate instruments, but this study reports on data collected on teacher-student interactions using the Five-Minute Observation tool. The Five-Minute Observation (FMO) uses a combination of event and time-sampling methods to collect data about teacher/activity focused interactions with students. Table 3 lists the modified definitions for FMO codes used in this study.

Reliability

The first stage of observer training included practice coding of 12 written transcripts of classroom events. Each written transcript was coded then scored against a criterion developed by the primary researchers. Agreements and disagreements were discussed among the observer-trainees and the primary researchers. A criterion of 85%

agreement with the key was required to proceed to the second stage of training.

Stage two involved coding timed sequences from videotaped classrooms. In this stage, observer-trainees viewed videotaped segments of classrooms from the target schools. Each teacher-student interaction for the 15 minute segments were coded then compared to a criterion prepared by the primary researchers. During this stage, the observer-trainees could stop the videotape and consider the appropriate code. Agreements and disagreements were again discussed among the observer-trainees and the primary researchers. Trainees continued coding segments until they reached an 85% correct criterion and then moved on to the next stage of training.

In the final stage of training, observer-trainees coded videotapes of naturally occurring classroom events. A comparison of the number of interactions coded and the percent of responses assigned to each code category yielded no significant differences between data collectors.

Procedures

Four trained, graduate student observers collected data for this study. The observations were completed at random times throughout the school day. The observers entered the classroom unannounced and used the FMO to code interactions between the teacher and students every five seconds (or less) for five minutes of observation. Four consecutive cycles or twenty minutes of FMO observations were completed during each observation.

Observations were collected for each teacher over a two or three day period. Observations were collected on non-consecutive days of the week. Teacher 1 had 32 FMOs (2341 interactions) collected in eight sessions over three days. Teacher 2 had 36 FMOs (2951 interactions) collected in nine sessions over three days. Teacher 3 had 31 FMOs (2016 interactions) collected in eight sessions over three days. Teacher 4 had 22 FMOs (1834 interactions) collected in six sessions over two days.

Classroom observations were not formally scheduled. The observer occasionally entered the classroom to observe and found that the classroom had a special speaker or a substitute teacher, or that the class was attending a school-wide assembly, or had specials scheduled for the time period. For these reasons, the number of observations for individual teachers varied across the data collection period.

Data Analysis

Data were summarized for four classroom process variables: (a) the initiator of the interaction (who codes) which could include the teacher, an aide if present, individual or groups of students, (b) the receiver of the interaction (to whom codes) which could include any of several combination or adults or students, (c) intent of the interaction (what codes) which included instructional and non-instructional activities, and (d) the type of interactions (how codes) academic, behavior, or other. Several of the original intent codes were combined. General comments and task-related comments were combined to form a comment category. Listener acknowledgement of the speaker and

feedback given by the speaker were combined into a category labeled acknowledge/feedback. Due to the extremely low rate of connectivity, praise, movement, and no response codes, these codes were combined to a category labeled other.

Data were summarized for data analysis by totaling the frequencies for each of the classroom process variables for each FMO. Each FMO included between 70 and 84 interactions. Mean percents and standard deviations were computed for each FMO. Grand means and standard deviations were computed for each teacher individually

Two types of data analysis were conducted. The mean, mode, and range were determined for each classroom process variable for each teacher. The mean percent of interactions for the four classroom process variables was used to provide a picture of the common classroom process variables in one urban school district. Then Spearman Rank Order Correlations were computed for the four classroom process variables. Stallings and Freiberg's (1991) criterion of a .70 correlation across observations was used as the measure of consistency of classroom processes.

Results

Tables 4-6 summarizes the grand means for the classroom process variables for the four teachers. The mean percent of interactions was computed for each of the four classroom process variables for each of the teachers to address the question of whether stable patterns of teacher behavior could be identified. The teachers' patterns of behavior are described in this section of the paper.

As seen in Table 4, the teacher was the primary initiator of classroom interactions for all classrooms. All teachers in the study initiated at least 60% of the interactions in their classrooms. The pattern of initiator-recipient interactions varied across teachers. Teacher 1 initiated most of her interactions to the whole class of students. Teacher 2 initiated interactions with the whole class for about half of the interactions and for about a third of the interactions questioned individual students who responded to her. For Teachers 3 and 4, 20% to 25% of their interactions were to the whole class and 25% to 50% of their interactions were recitations or Q & A with individual students in their classrooms. For the present sample of teachers, very little small group activity occurred during the observation period.

Table 5 shows patterns of interactions across teachers and for individual teachers the Intent process variables. All teachers spent less than half of their interactions in direct instruction. For all teachers the proportion of lower-order, direct questions far exceeded the proportion of higher-order, open-ended questions. Typical patterns of behavior could also be inferred for individual teachers. Teacher 1's typical pattern of classroom interaction was a period of direct instruction (instruct) interspersed with recitation (comment and question codes) and seatwork (observing and listening). Teacher 2's pattern of classroom interactions included direct instruction (instruct) and recitation (comment and question codes). Teacher 3's classroom was characterized by the majority of time devoted to seat

work (waiting, observing, listening). Direct instruction and student teacher discussion were limited. Teacher 4's pattern was to spend about 40% of the time in direct instruction and the remainder of the time in teacher-student or student-student interaction.

Table 6 shows the descriptive statistics for the Type of teacher-student interactions. Types of classroom interactions (How codes) were coded into three content categories: academic, behavior, and other and three affect categories: positive, negative, and neutral. There was considerable variability among the four teachers in the percent of academic interaction codes. Teacher 2 had the highest percent of academic interactions (94%); for Teachers 3 and 4 about half of the classroom interactions were coded as academic. All the teachers had very few behavioral interactions. Interactions in all teachers' classrooms were coded as neutral in affect. Neither positive nor negative interactions were evident in any of the teachers' classrooms.

Table 7 shows the mean, mode and range of all Spearman correlations for each teacher by process variable (i.e., speaker, listener, intent & type). The percent of correlations above the .70 criterion are reported separately for each of the four classroom process codes. For the initiator (who) code, all correlations were above .70 for teachers 1, 3, and 4. For Teacher 2, 75% of the correlations were .70 or higher.

A similar pattern of consistency was evident for the recipient (to whom) codes. For teacher 1, 51% of the correlations were above .70;

for Teacher 2, 78% were above .70 ; for Teacher 3, 61% were above .70; and for Teacher 4, 87% were above .70.

Correlations among the Intent (What) and Type (How) codes also indicated a high level of consistency for Teachers 1, 2, and 4. Teacher 3 displayed a much wider range of Intent and Type codes than the other three teachers did. For the Intent (What) codes, 57% of the correlations were above .70 for Teacher 1; 86% of the correlations were .70 or higher for Teacher 2; for Teacher 3, 39% of the correlations were .70 or higher; and for Teacher 4, 100% of the correlations were .70 or higher. A similar pattern emerged for the Type (How) codes. Teacher 1 had 95% of correlations across Type codes of .70 or higher. Teacher 2 had 78% of the Type correlations of .70 or higher. Teacher 3 had 39% of the Type correlations of .70 or higher; and Teacher 4, had 100% of the correlation between Type codes of .70 or higher.

Teachers 2 and 4 the intermediate grade and high school teachers showed highly consistent pattern of classroom interactions. The primary teacher also had more than half of the correlations for each of the classroom process variables above .70. The middle level teacher showed the least consistent pattern of classroom processes. For the total sample, 228 of 304 (75%) correlations were .70 or higher.

Discussion

The present study addressed the question of the consistency of teachers' classroom interactions. Four teachers instructing in

primary, intermediate, middle level, and high school classrooms were observed across days and periods of the day. All teachers showed a high level of consistency in their classroom interactions. The findings in the present study were similar to that of Ayers (1983) and Stallings and Frieberg (1991).

The teachers in the primary and intermediate classrooms showed a high degree of consistency of behavior over all periods of the day. While they taught different subjects to the same groups of students, their patterns of classroom interactions remained consistent. Across the four classroom components observed, the median correlations across interaction components all exceed the .70 criterion level. The middle level and high school teachers taught the same subject matter to different groups of students. For both of these teachers, the pattern of teacher-student (initiator-receiver) interaction remained consistent. The middle level teacher displayed greater variability in instructional intent than the high school teacher did. The high school teacher maintained the same pattern of instructional interaction across different groups of students.

The reactive effect of an observer in the classroom always raises the question of whether an observer is seeing the typical behavior that occurs in a classroom. Questions about reactivity are central to the generalizability of single classroom observations, announced classroom observations, and high stakes classroom observations such as principal or supervisor observations (Good & Brophy, 1994). In the present study, classroom observations were conducted over a two-week

instructional period, they were unannounced, and the teachers being observed did not perceive the observations as high stakes. Teachers knew that the results of the classroom observations would not be shared with their building principals or supervisors. For these reasons, the reactive effects were held to a minimum. Furthermore, given the number of observations per teacher, it is unlikely that a teacher could both implement and maintain an unfamiliar teaching routine for the number and length of the observation periods. For this reason, it seems safe to assume that the behaviors observed were the teachers' typical behaviors.

Teachers instructing in particular disciplines may believe that particular classroom instructional activities lead to more or better learning of the discipline, and they may implement the instructional activities consistent with this view. Good and Power (1976) point out that certain instructional practices are more effective with students with particular characteristics. The present study was conducted in an urban school district in a high poverty area, and it is possible that the teachers selected instructional processes in part to help them maintain control in their classrooms (Good & Brophy, 1995). Future research needs to collect teachers' explanations of the reasons they select particular instructional procedures and their evaluations of the effectiveness of the instructional procedures they implement.

While there is much to recommend the value of observational data in understanding classroom processes and in assisting teachers to monitor changes in their instructional strategies, it is a time

consuming and costly activity. Observation is also anxiety producing for teachers (Good & Brophy, 1994) who are most accustom to the high stakes observations that are a part of teacher performance reviews or parent dissatisfaction with the education or treatment that their child is receiving. Because of the high stakes nature of most teacher observations, teachers have come to question the validity of the often high inference judgments made by individuals who teachers do not believe have the qualifications or experience to make valid judgments about their effectiveness as teachers.

The observational system used in the present study was very low inference; it was a cataloging of a prespecified set of classroom process variables. No judgements were placed on the processes observed. We report what was observed in the classroom, but not the effectiveness of the processes from either the teachers' or students' points of view. The next step is to observe classroom process variables and to relate them to teachers' evaluations of their instructional effectiveness and to student outcome variables.

Caution must be exercised in interpreting our results. The sample size for the study was small; however, the number of observations per individual teacher was large. Furthermore, we judged the overall consistency of the teachers' classroom behaviors which may have obscured the consistency/inconsistency of specific teacher behaviors. Rogoso et al. (1984) recommends focusing upon specific teacher behaviors and testing the consistency of the specific behaviors by viewing the behavior as a series of Bernouli trials. These authors

further recommend reporting the empirical rates for teacher behaviors of interest. Both of these data analysis and reporting paradigms should be incorporated into future research

All observations were collected at roughly the same time in the semester, which may limit the generalizability of the results. Teachers may begin a new school year with the intention of implementing new instructional strategies, but return to comfortable strategies if they fall behind in instructional coverage or believe that the new strategies make classroom management more difficult. With these limitations in mind, it seems safe to conclude that classroom process variables are more consistent than random and that observation is a potentially useful tool in increasing our general understanding of the role of classroom process variables in explaining the variance in student outcome measures.

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Table 1

Demographic Characteristics of the Participants and the Classrooms Observed

Characteristics	Teacher #1	Teacher #2	Teacher #3	Teacher #4
Age	38	41	54	57
Gender	Female	Female	Female	Female
# of Years Teaching	10	4	30	16
Level	Elementary	Intermed.	Middle	High School
# of Students	26	17	17 (ave.)	28 (ave.)
% of Minority	73	76	71	92
% of Female Students	42	53	44	53
% on Free/ Reduced Lunch	85	83	99	82
Special Education Students Fully Included in Regular Class / # of Students	Yes/2	Yes/2	No	Yes/3 (ave.)

Table 2

Percent of Observations in which a Particular Academic Content or Activities Were Observed for Each Classroom

Content/Activity	Teacher #1	Teacher #2	Teacher #3	Teacher #4
Reading	48	8	68	0
Math	15	58	0	0
Science	0	2	3	86
Social Studies	3	16	29	0
Music/Story	21	0	na	na
Transitions	7	2	0	9
Practical Skills	0	6	na	na
Arts/Crafts	3	0	na	na
Class Management	0	8	0	5
Unknown	3	0	0	0

Table 3

Modified FMO Codes Used in this Study

The "Who" Column

The "Who Column" indicates who is doing the talking or action.

Code	Code Usage
T - Teacher	The one person who is ultimately responsible for the everyday conduct of the classroom.
A - Aide	Adults who work in the classroom regularly and are paid by the school district.
V - Volunteer	Any other adult who works in the classroom such as a parent.
C - Child	Refers to any individual child with whom the adult is interacting.
D - Different Child	A second child in the interaction.
2 - Two Children	
S - Small Group	3-8 children.
L - Large Group	9 or more children.
An - Animal	Any live animal in the classroom
M - Machine	Tape Player, TV, etc.

The "To Whom" Column

The "To Whom" Column indicates the person, group, or machine that is being talked to or interacted with: These codes are the same as the codes for the "Who column.

Table 3 (continued)

Modified FMO Codes Used in this Study

The "What" Column

The "What column refers to verbal interactions between people in the classroom, unless otherwise specified as nonverbal. These codes defined below describe the behavior or intent of the interaction.

Code	Code Usage
1 - Command or Request	Code 1 asks for a response free of argument or speculation. There is one expected, acceptable response that is to be carried out, verbally or non-verbally
1Q - Direct Question	Code 1Q questions are those that ask for direct recall of material already learned, or anticipate a specific or automatic response or a yes-no answer. Code 1Q questions elicit the following responses: statements of preference, statements of fact, itemizing, classifying and definitions (lower cognitive level).
2 - Open-Ended Questions	Code 2 questions are those that allow a free expression of ideas or feelings and invite opinions. Code 2 questions encourage responses that require: interpreting ideas, cause and effect establishing relationships, making comparisons, reasoning, applying previously learned material to a new situation, and describing a process. Code 2 can be request for information not a question (higher cognitive level)
3 - Response	Code 3 is a response to a command or a question, or is corrective.
4 - Instruction, Explanation	Code 4 is used when a teacher or child is verbally giving new information to others, reviewing lessons, or explaining rules of behavior.
C - Instruction, Explanation (Connectivity)	Code C is used when a teacher or child is verbally connecting new information to previously learned material or to life events. This code should be used only with codes 1; 2 or 4.

Table 3 (continued)

Modified FMO Codes Used in this Study

The "What" Column

Code	Code Usage
5 - General Comments/ General Action	Greetings, personal compliments, social or non-task related comments and remarks. Irrelevant remarks are also coded 5.
6 - Task-Related Comments	Code 6 is used for a statement about the activity or problem at hand.
7 - Acknowledge	An indication that a response, product or behavior is recognized or agreed with is coded 7. Another form of acknowledgment is to repeat someone else's statement immediately. Code 7 with an A in the How column is used to indicate acknowledgment of a response having to do with academic subject matter, whereas when used with a B in the How column to indicate acknowledgment of a response having to do with behavior
8 - Praise	Code 8 is used for praise of a response, product or behavior. Praise in academic areas is coded * with an A in the How column, praise for behavior is coded 8 with B in the How column.
9 - Corrective Feedback	Corrective feedback is the attempt to change or modify a response,product or behavior. Code 9 is used when the subject of the observation tries to change another's behavior or correct another's work.
10 - No Response	Code 10 is used for no response when a response is called for to complete the interaction but none is forthcoming.
11 - Waiting	Code 11 is used when the subject of the observation is waiting in line or for materials, attention, use of equipment, or activity change. It is also used when the subject is not attending or is not involved with anyone or anything.

Table 3 (continued)

Modified FMO Codes Used in this Study

The "What" Column

Code	Code Usage
12 - Observing, Listening	Code 12 is used when the subject of the observation is listening to or watching other people, other activities, TV, slides, films, and the like.
NV - Nonverbal	When the action being coded is not accompanied by words, NV is coded in the What column, along with the other relevant codes.
X - Movement	Code X is used when the subject of the observation or person with whom the subject is interacting moves. X can be used with any What code. If the movement is nonverbal and no What code is applicable, code X with 5.

The "How" Column

Categories of the How column are used in conjunction with the What codes.

Code	Code Usage
H - Happy	Obvious behavioral expressions of happiness or positive affect, such as laughing, smiling, and giggling are coded with H.
U - Unhappy	Code U is used for obvious behavioral expressions of sadness or unhappiness, such as crying or welling tears.
N - Negative	Expressions of annoyance or anger, negative content, scolding, rejection and destructive behavior are coded N.
T -Touch	Whenever one person touches another T is coded - with H to denote a positive touch, with N to denote a negative touch, and with P to denote a punishing touch from an adult.

Table 3 (continued)

Modified FMO Codes Used in this Study

The "How" Column

Code	Code Usage
Q - Question	Code Q is used with 1 for a direct question and with 9 when corrective feedback is in question form.
G - Guide/Reason	G is coded with 9 when corrective feedback is positive and guides to an alternative activity, approach to a problem, and the like, or when the corrective includes a reason or explanation.
P - Punish	Code P covers a range of adult disciplinary or behavior-modifying techniques, including withholding of privileges, isolation of a child and physical punishment. P is coded only with 9 in the How column.
O - Object	Code O is used with concrete, inanimate objects that are used in nonverbal self-instruction.
W - Worth	Code W is used with child statements of self-worth, self-praise, or self-esteem; exclamations of accomplishment; positive remarks about one's self; bragging.
DP - Dramatic Play/Pretend	Code DP describes playacting, puppet shows and other dramatic presentations, talking to toys or dolls, pretending or making believe, role playing.
A - Academic	Interactions that have to do with the development of basic skills as measured on achievement tests are coded A.
B - Behavior	Code B describes interactions concerned with classroom behavior (conduct). Code B is used only with the feedback codes (5, 7, 8, & 9) and with the responses to them.

Note: If neither A nor B is coded, it is assumed that the frame concerns other task-related content.

Table 3 (continued)

Modified FMI Codes Used in this Study

The R, S, & C Codes

Code	Code Usage
R -Repeat	If the interaction being observed continues without change or interruption, Code R is used in subsequent frames (approximately every five seconds) until the action is interrupted by another interaction or stops. Code R repeats the interaction from the frame above.
S - Simultaneous	The simultaneous code is used to record inattention by a child or children while an adult-led activity is going on. It allows the observer to record what the child or children are doing, as well as the activity to which they should be attending.
C - Cancel	When a mistake is made in coding an interaction, code C is used in the left margin of the miscoded frame and the next frame is coded correctly.

Table 4

Grand Means and Mean of Standard Deviations for Frequency of Teacher -Student Interactions over all Five Minute Observations by Teacher

	Teacher							
	1		2		3		4	
	M	SD	M	SD	M	SD	M	SD
Initiator								
Teacher	92.60	4.35	63.50	11.73	91.40	6.12	76.00	6.01
Child	6.70	3.92	17.10	10.22	8.30	5.59	23.50	6.42
Small Group	.40	.68	2.70	3.06	.00	.00	.30	.43
Large Group	.40	.41	16.60	13.14	.30	.41	.20	.40
Listener								
Teacher	7.40	4.30	34.50	13.82	7.30	5.06	24.60	6.43
Child	11.40	4.80	19.30	14.32	24.30	11.00	49.60	18.70
Small Group	10.00	12.40	.10	.27	.10	.08	4.70	2.89
Large Group	71.20	16.27	46.10	19.04	26.70	11.79	21.00	22.80

Table 5

Grand Means and Mean of the Standard Deviations for Frequency of Intent of the Interaction between subjects in the classroom by Teacher

	Teacher							
	1		2		3		4	
	M	SD	M	SD	M	SD	M	SD
Command	5.90	3.31	4.70	3.47	3.20	2.47	5.60	4.86
Direct Questions	6.00	3.18	16.30	6.45	5.30	3.85	14.00	3.86
Open-Ended Questions	3.70	4.07	.10	.14	.04	.08	.70	1.02
Verbal Response	6.20	4.16	20.80	13.82	4.40	3.72	13.50	4.79
Non-Verbal Responses	.50	.64	13.90	11.27	.36	.44	1.30	1.60
Instruct	27.80	22.08	35.30	12.92	3.60	4.34	39.30	20.02
Comment	12.90	9.07	4.70	4.41	8.30	7.21	11.60	10.49
Acknowledge/Feedback	1.70	1.96	2.80	2.22	7.20	7.42	8.90	5.44
Waiting	2.50	3.48	.50	.91	43.70	15.08	.40	.62
Observing/Listening	31.60	23.82	.00	.00	23.20	11.17	2.20	3.55
Other	1.20	1.00	.70	.96	.70	1.26	2.50	2.40

Table 6

Grand Means and Mean of the Standard Deviations for Frequency of Type of Teacher-Student Interaction

	Teacher							
	1		2		3		4	
	M	SD	M	SD	M	SD	M	SD
Academic	15.1	18.2	94.4	5.2	42.4	6.9	51.6	20.8
Behavioral	1.1	1.5	2.2	2.5	5.5	5.5	6.3	4.4
Procedural	83.8	18.4	3.4	4.7	52.1	9.9	42.1	21.1
Positive	.5	1.4	.7	1.0	.1	.3	8.2	5.1
Negative	.8	1.1	0	0	4.9	4.5	.6	.9
Neutral	98.7	1.2	99.3	.4	95.0	4.7	91.2	5.3

Table 7

Mean, Mode, and Range of Spearman Correlations Between Classroom Process Variables Over All Observations by Teacher

	Teacher											
	1			2			3			4		
	M	Mode	Range	M	Mode	Range	M	Mode	Range	M	Mode	Range
Speaker	.94	.95	.20	.75	.80	.80	.97	.95	.05	.93	.95	.20
Listener	.65	.80	.80	.87	1.0	.60	.66	.80	.80	.80	.80	.60
Intent	.72	.80	.64	.85	.89	.48	.51	.43	.95	.89	.89	.18
Type	.87	.89	.33	.80	.87	.50	.52	.34	.89	.91	.90	.20